REMARKS

Specification

The Office has objected to the disclosure, at page 4 of the Office Action, due to informalities. Applicants have amended the Specification to comply with the Office Action. Applicants have also corrected equation (1) in the Specification.

Applicants respectfully request withdrawal of the objection.

Claims 1-5 and 8-16 are Allowable

The Office has rejected claims 1-3 and 8-12, at page 4 of the Office Action, under 35 U.S.C. §102(b), as being anticipated by U.S. Patent No. 5,576,772 ("Kondo"). Applicants respectfully traverse the rejections.

None of the cited references, including Kondo, disclose or suggest the specific combination of claim 1. For example, Kondo does not disclose determining a similarity of one of the reference macroblocks and a selected one of said at least one current macroblock based on calculated pixel units in the selected current macroblock and the reference macroblocks, where one calculated pixel unit comprises an average of two adjacent pixels, as recited in claim 1. Instead, Kondo discloses a multi-stage approach for obtaining a motion vector, with the coarse stage evaluated for (4 pixel x4 lines) blocks, an intermediary stage evaluated for (2x2) blocks, and the finest stage evaluated on a pixel by pixel basis. *See* Kondo, col. 6, line 60 – col. 7, line 6. Kondo does not determine similarity based upon calculated pixel units. Therefore, Kondo fails to disclose at least one element of claim 1. Hence, claim 1 is allowable.

Claims 2-3 depend from allowable claim 1. Therefore, claims 2-5 are allowable over Kondo, at least by virtue of their dependency from claim 1.

Further, the dependent claims recite additional features that are not disclosed by the cited references. For example, Kondo does not disclose calculating an absolute difference of each calculated pixel unit for the current macroblock and a corresponding calculated pixel unit for one of the reference macroblocks resulting in a plurality of calculated absolute differences, as recited in claim 2. Rather, Kondo discloses, for the third hierarchical stage, the first part of a motion

vector detection operation, calculating a constant component that is the mean value of pixels in a 4x4 block, and a transient component that is a standard deviation of the pixels in the 4x4 block; for the second hierarchical stage, determining mean and standard deviation for each of 2x2 blocks of pixels; and for the first hierarchical stage, determining sums of absolute values of pixel by pixel differences between the base block and the inspection block. *See* Kondo, col. 8, line 13 – col. 9, line 55. Kondo does not disclose calculating an absolute difference for each <u>calculated pixel unit</u> of the current macroblock and the corresponding calculated pixel unit of the reference block. For this additional reason, claim 2 is allowable.

None of the cited references, including Kondo, disclose or suggest the specific combination of claim 8. For example, Kondo does not disclose or suggest determining a similarity of one of said reference macroblocks and said current macroblock based on <u>calculated pixel units</u> in said current macroblock and a first determined set of said reference macroblocks, where <u>one calculated pixel unit comprises an average of two adjacent pixels</u>, as recited in claim 8. Instead, Kondo discloses a multi-stage approach for obtaining a motion vector, with the coarse stage evaluated for (4 pixel x 4 lines) blocks, an intermediary stage evaluated for (2x2) blocks, and the finest stage evaluated on a pixel by pixel basis. *See* Kondo, col. 6, line 60 – col. 7, line 6. Kondo does not determine similarity based upon <u>calculated pixel units</u>. Therefore, Kondo fails to disclose at least one element of claim 8. Hence, claim 8 is allowable.

Claims 9-12 depend from claim 8, which Applicants have shown to be allowable. Therefore, claims 9-12 are allowable, at least by virtue of their dependence from claim 8.

Further, the dependent claims recite additional features that are not disclosed by the cited references. For example, Kondo does not disclose calculating an absolute difference of a calculated pixel unit in said current macroblock and a corresponding calculated pixel unit in one of said reference macroblocks resulting in a plurality of calculated absolute differences where <u>one calculated pixel unit is defined comprises two adjacent pixels</u>, as recited in claim 9. Rather, Kondo discloses, for the third hierarchical stage, calculating a constant component that is the mean value of pixels in a 4x4 block, and a transient component that is a standard deviation of the pixels in the 4x4 block; for the second hierarchical stage, determining mean and standard deviation for each of 2x2 blocks of pixels; and for the first hierarchical stage, determining sums

of absolute values of pixel by pixel differences between the base block and the inspection block. *See* Kondo, col. 8, line 13 – col. 9, line 55. Kondo does not disclose calculating an absolute difference of for each <u>calculated pixel unit</u> of the current macroblock and the corresponding calculated pixel unit of the reference block where <u>one calculated pixel unit comprises an average of two adjacent pixels</u>. For this additional reason, claim 9 is allowable.

Claims 1-3, 8-10, 21-26, 34, and 36-38 are Allowable

The Office has rejected claims 1-3, 8-10, 21-26, 34, and 36-38 at page 7 of the Office Action, under 35 U.S.C. §102(b), as being anticipated by U.S. Patent No. 6,011,870 ("Jeng"). Applicants respectfully traverse the rejections.

None of the cited references, including Jeng, disclose or suggest the specific combination of claim 1. For example, Jeng does not disclose determining a similarity of one of the reference macroblocks and a selected one of said at least one current macroblock <u>based on calculated pixel units</u> in the selected current macroblock and the reference macroblocks, where <u>one calculated pixel unit comprises an average of two adjacent pixels</u>, as recited in claim 1. Instead, Jeng discloses calculating a signal 100 by combining adjacent pel pairs of motion vector values associated with each horizontally-neighboring pel pair. *See* Jeng, col. 8, lines 18-24. Therefore, Jeng does not disclose or suggest each and every element of claim 1. Hence, claim 1 is allowable.

Claims 2-3 and 21-23 depend from claim 1, which Applicants have shown to be allowable. Therefore, claims 2-3 and 21-23 are allowable, at least by virtue of their dependence from allowable claim 1.

None of the cited references, including Jeng, disclose or suggest the specific combination of claim 8. For example, Jeng does not disclose determining a similarity of one of said reference macroblocks and said current macroblock based on <u>calculated pixel units</u> in said current macroblock and a first determined set of said reference macroblocks, where <u>one calculated pixel unit comprises an average of two adjacent pixels</u>, as recited in claim 8. Instead, Jeng discloses calculating a signal 100 by combining adjacent pel pairs of motion vector values associated with each horizontally-neighboring pel pair. *See* Jeng, col. 8, lines 18-24. Therefore, Jeng does not disclose or suggest each and every element of claim 8.

Claims 9-10 and 24-26 depend from claim 8, which Applicants have shown to be allowable. Therefore, claims 9-10 and 24-26 are allowable, at least by virtue of their dependence from allowable claim 8.

None of the cited references, including Jeng, disclose or suggest the specific combination of claim 34. For example, Jeng does not disclose determining a calculated pixel unit of a current macroblock, wherein one calculated pixel unit comprises an average of two adjacent pixels, as recited in claim 34. Instead, Jeng discloses calculating a signal 100 by combining adjacent pel pairs of motion vector values associated with each horizontally-neighboring pel pair. *See* Jeng, col. 8, lines 18-24. Therefore, Jeng does not disclose or suggest each and every element of claim 34. Hence, claim 34 is allowable.

Claims 36-38 depend from claim 34, which Applicants have shown to be allowable. Therefore, claims 36-38 are allowable, at least by virtue of their dependence from allowable claim 34.

Claims 4, 5, and 13-16 are Allowable

The Office has rejected claims 4, 5, and 13-16, at page 9 of the Office Action, under 35 U.S.C. §103(a) as being unpatentable over Kondo. Applicants respectfully traverse the rejections.

As explained above, Kondo does not disclose or suggest each of the elements of claims 1 and 8. Claims 4 and 5 depend from allowable claim 1, and claims 13-16 depend from allowable claim 8. In addition, the Office Action states that it would have been obvious to use of sum of squares of differences in place of SAD. The cited references do not disclose or suggest each of the elements of claims 1 or 8.

For example, as explained above, Kondo does not disclose or suggest determining a similarity of one of the reference macroblocks and a selected one of said at least one current macroblock based on calculated pixel units in the selected current macroblock and the reference macroblocks, where one calculated pixel unit comprises an average of two adjacent pixels, as recited in claim 1. In addition, the Office Action states that it would have been obvious to use of sum of squares of differences in place of SAD. The cited references, separately, or in

combination, do not disclose this element of claim 1. Therefore, claim 1 is allowable, and claims 4-5, which depend from claim 1, are also allowable, at least by virtue of their dependence from allowable claim 1.

Additionally, as explained above, Kondo does not disclose or suggest determining a similarity of one of said reference macroblocks and said current macroblock based on calculated pixel units in said current macroblock and a first determined set of said reference macroblocks, where one calculated pixel unit comprises an average of two adjacent pixels, as recited in claim 8. In addition, the Office Action states that it would have been obvious to use of sum of squares of differences in place of SAD. The cited references, separately, or in combination, do not disclose this element of claim 8. Therefore, claim 8 is allowable, and claims 13-16, which depend from claim 1, are also allowable, at least by virtue of their dependence from allowable claim 8.

Claims 27-33 are Allowable

The Office has rejected claims 27-33, at page 10 of the Office Action, under 35 U.S.C. §103(a) as being unpatentable over Jeng. Applicants respectfully traverse the rejections.

None of the references, including Jeng, disclose or suggest the specific combination of claim 27. For example, Jeng does not disclose a first motion estimation processor to determine the similarity based on calculated pixel units in the current macroblock and a first determined set of calculated pixel units of the reference macroblock, the first motion estimation processor to output coarsed-tuned data, where one calculated pixel unit comprises an average of two adjacent pixels, as recited in claim 27. Instead, Jeng discloses an averaging module that optionally generates a pixel-averaged signal, calculating the signal by averaging values for each sequential horizontally-neighboring pel pairs of motion vector values associated with each horizontally-neighboring pel pair. *See* Jeng, col. 8, lines 18-24. Therefore, Jeng does not disclose each and every element of claim 27. The Official Notice does not disclose or suggest this element of claim 27. Instead, the Official Notice states that it is well known in the art to use of memory in order to buffer incoming images/video for processing. The cited references, separately or in combination, do not disclose or suggest each and every element of claim 27. Hence, claim 27 is

allowable, and claims 28-33, which depend from claim 27, are also allowable, at least by virtue of their dependence from allowable claim 27.

Claims 6, 7, and 17- 20 are Allowable over Kondo in view of Demos

The Office has rejected claims 6, 7, 17, and 20, at page 11 of the Office Action, under 35 U.S.C. §103(a) as being unpatentable over Kondo in view of U.S. Patent No. 6,442,203 ("Demos"). Applicants respectfully traverse the rejections.

As explained above, Kondo fails to disclose or suggest each and every element of claims 1 and 8. Demos does not disclose the elements of claims 1 and 8 that are not disclosed by Kondo.

For example, Demos does not disclose determining a similarity of one of the reference macroblocks and a selected one of said at least one current macroblock based on calculated pixel units in the selected current macroblock and the reference macroblocks, where one calculated pixel unit comprises an average of two adjacent pixels, as recited in claim 1. Instead, Demos discloses use of multiplication of pixels of two images to remove a constant component (DC) bias in finding an object location in a previous or subsequent frame. See Demos, col. 12, 28-col. 13, line 47. Therefore, Kondo and Demos, separately or in combination, do not disclose or suggest each and every element of claim 1, or of claims 6 and 7, which depend from claim 1. Hence, claims 6 and 7 are allowable.

Additionally, Demos does not disclose determining a similarity of one of said reference macroblocks and said current macroblock based on calculated pixel units in a current macroblock and a first determined set of reference macroblocks, where one calculated pixel unit comprises an average of two adjacent pixels, as recited in claim 8. Instead, Demos discloses use of multiplication of pixels of two images to remove a constant component (DC) bias in finding an object location in a previous or subsequent frame. See Demos, col. 12, 28-col. 13, line 47. Therefore, Kondo and Demos, separately or in combination, do not disclose or suggest each and every element of claim 8, or of claims 17-20, which depend from claim 8. Hence, claims 17-20 are allowable.

Claims 6, 7, and 17-20 are Allowable over Jeng in view of Demos

The Office has rejected claims 6, 7, and 17-20, at page 11 of the Office Action, under 35 U.S.C. §103(a) as being unpatentable over Jeng in view of Demos. Applicants respectfully traverse the rejections.

As explained above, Jeng fails to disclose or suggest each and every element of claims 1 and 8. Demos does not disclose the elements of claims 1 and 8 that are not disclosed by Jeng.

For example, Demos does not disclose determining a similarity of one of the reference macroblocks and a selected one of said at least one current macroblock based on calculated pixel units in the selected current macroblock and the reference macroblocks, where one calculated pixel unit comprises an average of two adjacent pixels, as recited in claim 1. Instead, Demos discloses use of multiplication of pixels of two images to remove a constant component (DC) bias in finding an object location in a previous or subsequent frame. *See* Demos, col. 12, 28-col. 13, line 47. Therefore, Jeng and Demos, separately or in combination, do not disclose or suggest each and every element of claim 1, or of claims 6 and 7, which depend from claim 1. Hence, claims 6 and 7 are allowable.

Additionally, Demos does not disclose determining a similarity of one of said reference macroblocks and said current macroblock based on calculated pixel units in a current macroblock and a first determined set of reference macroblocks, where one calculated pixel unit comprises an average of two adjacent pixels, as recited in claim 8. Instead, Demos discloses use of multiplication of pixels of two images to remove a constant component (DC) bias in finding an object location in a previous or subsequent frame. *See* Demos, col. 12, 28-col. 13, line 47. Therefore, Jeng and Demos, separately or in combination, do not disclose or suggest each and every element of claim 8, or of claims 17-20, which depend from claim 8. Hence, claims 17-20 are allowable.

CONCLUSION

Applicants have pointed out specific features of the claims not disclosed, suggested, or rendered obvious by the references applied in the Office Action. Accordingly, Applicants respectfully request reconsideration and withdrawal of each of the objections and rejections, as well as an indication of the allowability of each of the pending claims.

Any changes to the claims in this amendment, which have not been specifically noted to overcome a rejection based upon the prior art, should be considered to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

The Examiner is invited to contact the undersigned attorney at the telephone number listed below if such a call would in any way facilitate allowance of this application.

The Commissioner is hereby authorized to charge any fees, which may be required, or credit any overpayment, to Deposit Account Number 50-2469.

Respectfully submitted,

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Date

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